On the whole this text seems well adapted to present needs and should meet with a generous response.

North High School,
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F. W. Gates.

New Plane Geometry. By Edward Rutledge Robbins. American Book Company, New York, 1915. 264 pages.

This book is a revision of a Plane Geometry published by the same author a few years ago. The revision, as the author suggests, is an outgrowth of the author's experience and suggestions from teachers who have used the former edition as well as from recommendations of the "National Committee of Fifteen."

While the general plan of the new book is much the same as the old, there are many additions that make the book comply with recent demands.

Each page is attractive, the material is well arranged, statements of theorems and the words *given*, *to prove*, *proof*, etc., are in italics.

Simple fundamental truths are explained instead of being formally demonstrated," as for example, "all straight angles are equal." Several such will be found on pages 13 and 14.

No theorems are demonstrated in full. Proofs are given in outline, reasons indicated by references. It would seem that if a few theorems were demonstrated in full the pupil might have a more definite notion of what constitutes a complete demonstration.

Original exercises are scattered through the book in abundance. These appear as early as possible. After theorem (2) will be found eleven original exercises; after theorem (34), 28 exercises; after theorem (35), 11 more; and so on.

These exercises do not depend upon previous exercises for proofs, the numbered references alone being sufficient.

The large number of original exercises makes it possible to furnish the ambitious pupil with an abundance of choice material.

In all there are about 200 original exercises in Book I, especially of the theorem variety. Very few numerical problems are to be found in this book; possibly a number of such problems would have been an advantage.

Book II is unusually attractive. Definitions are well illustrated. A large number of original exercises are found in this book. These must be seen to be appreciated.

At the close of Book III will be found a collection of 69 exercises (numerical). These involve the application of a large number of theorems of every description. These exercises are followed by 53 original theorems, and these by 43 original constructions.

At intervals are historical notes which help to interest the pupil in the subject.

Summaries found on pages 68, 94, and 180 classify the theorems in a way that will be helpful for reference purposes.

This text seems to be an improvement over the author's earlier edition, both in attractiveness of the printed page and abundance of well-selected original exercises. After all the pupil's ability to solve original theorems is the real test of geometrical knowledge.

The text as a whole seems to meet very well the recent demands for the subject.

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F. W. GATES.

PROBLEMS AND SOLUTIONS.

EDITED BY B. F. FINKEL AND R. P. BAKER.

PROBLEMS FOR SOLUTION.

ALGEBRA.

441. Proposed by W. D. CAIRNS, Oberlin College.

Prove that the equation $(e-1)x = e^x - 1$ has two and only two real roots. [Adapted from *L'Intermédiaire*.]

442. Proposed by CLIFFORD N. MILLS, Brookings, North Dakota.

Show that the sum of n terms of the series $1/2 - 1/3 + 1/4 - 1/6 + 1/8 - 1/12 + \cdots$ is $1/3[1 - (1/2)^{n/2}]$ when n is even, and $1/3[1 + 2\sqrt{2}(1/2)^{(n/2)+1}]$ when n is odd.

GEOMETRY.

472. Proposed by PAUL CAPRON, U. S. Naval Academy.

The sides of a spherical triangle are a, b, c; the corresponding opposite angles are A, B, C; p and P are the polar distances of the inscribed and circumscribed circles; $a + b + c = 2s$; $A + B + C = 2S$. From a geometric figure, by the formula for solving right spherical triangles, show that

$$\tan^2 p = \operatorname{cosec} s \sin(s-a)\sin(s-b)\sin(s-c); \tag{1}$$

$$\cot^2 P = -\sec S \cos(S-A)\cos(S-B)\cos(S-C). \tag{2}$$

Thus establish the usual formulas for the tangent of the half-sides and half-angles.

Also show that

$$\frac{\text{sine of angle}}{\text{sine of the opposite side}} = \frac{\cot P \cos S}{\tan p \sin s}. \tag{3}$$

473. Proposed by FRANK R. MORRIS, Gendale, Calif.

What is the length of the longest rectangle an inch wide that can be placed inside another rectangle 12 inches long and 8 inches wide. Obtain the result correct to the third decimal.

CALCULUS.

393. Proposed by LAENAS G. WELD, Pullman, Ill.

Find the area of the least ellipse which can be drawn upon the face of a brick wall so as to inclose four bricks.

394. Proposed by W. W. BURTON, Macon, Ga.

A horse runs 10 miles per hour on a circular race-track in the center of which is an arc-light. How fast will his shadow move along a straight board fence (tangent to the track at the starting point) when he has completed one eighth of the circuit?